

CS 4442 Assign 4

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1 Report

MDS Analysis: The MDS results are highly similar between each layer, with some layers emphasizing similarly observed properties in a more dramatic way than others. For instance, the MDS results indicate that Faces are highly similar as they are clustered very close together in all MDS plots. This is further exemplified in cases such as the fc6 and fc7 MDS plots.

Additionally, we observe that Human Activities are clustered similarly in plots such as fc6, with Scenes, Objects, and Animals all being clustered around these human activities in distinct ways. The MDS plot results indicate lots of similarity among 1 dimension in similar categories depending on the layer being observed. For example, in the MDS for fc7 we see that the majority of Scenes are clustered near each other along Dimension 1 from 0-100, with only a few points being further away from the cluster.

Between the layers, it is evident that features are capturing different similarities in the MDS. One example is that the conv4, fc6, and fc7 layers seem to be the greatest at capturing similarity and dissimilarity between faces and other image types.

RDM Analysis: Looking at the RDM plots shows similarity in many areas between different layers. For example, we see that faces are evidently the most distinct images in all layers, varying in intensity between layers. This is observed by looking at the bottom right dark square of the MDS plots.

Furthermore, we see that conv3 is the worst at recognizing differences between images. The vast majority of conv3 is lit up in similarity and we can see that in the corresponding MDS it is hard to distinguish between images / observe trends. Evidently, fc6 seems to be the best layer for distinguishing among lots of groupings, especially when used in combination with other layers that provide more information into the similarity and dissimilarity between groupings that it does not capture well.

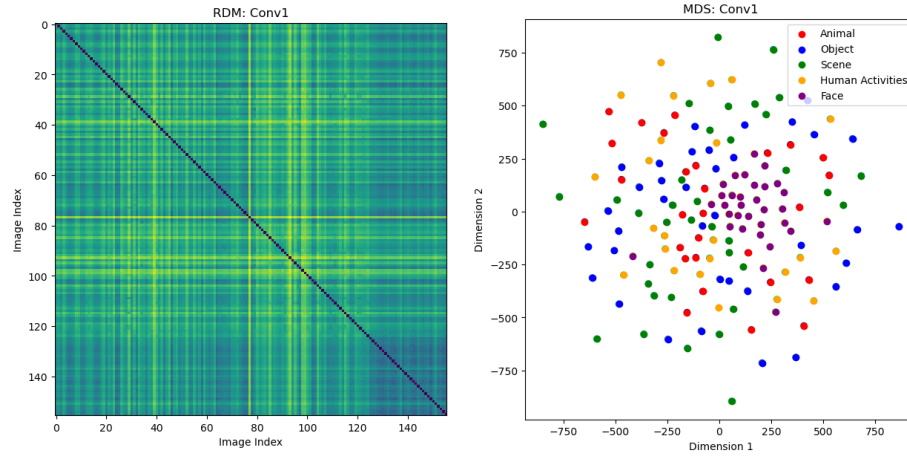


Figure 1: RDM and MDS for Conv 1 layer of the AlexNet model for the 156 images.

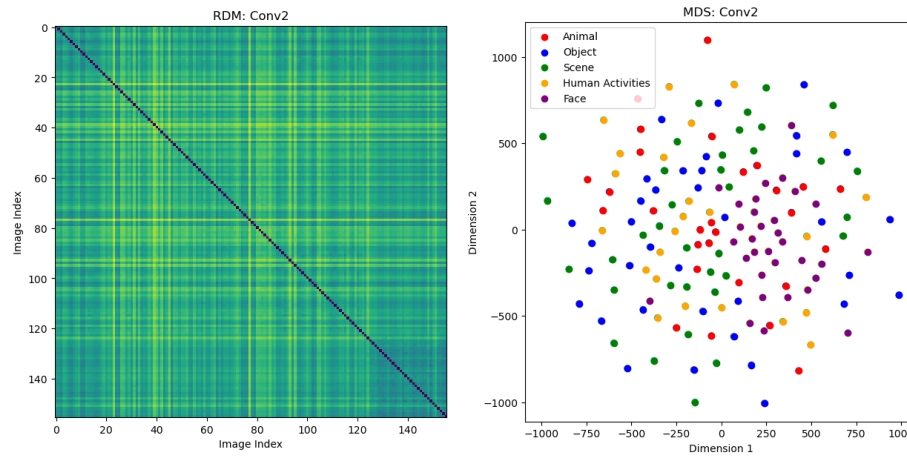


Figure 2: RDM and MDS for Conv 2 layer of the AlexNet model for the 156 images.

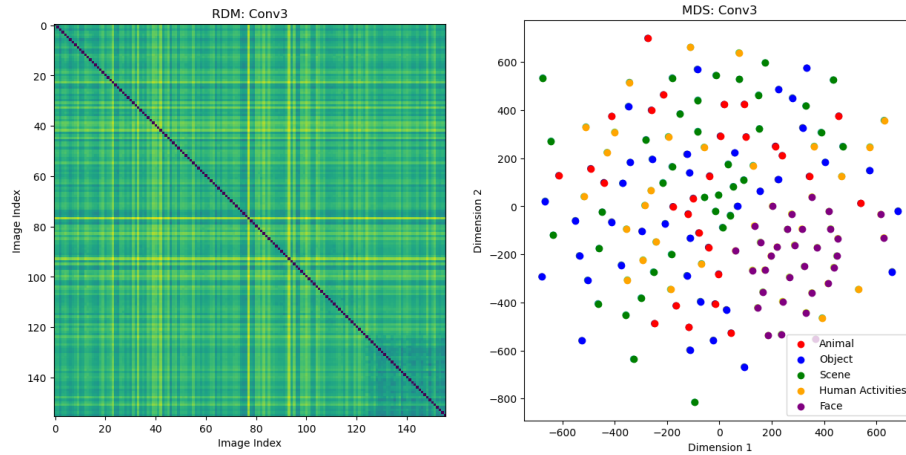


Figure 3: RDM and MDS for Conv 3 layer of the AlexNet model for the 156 images.

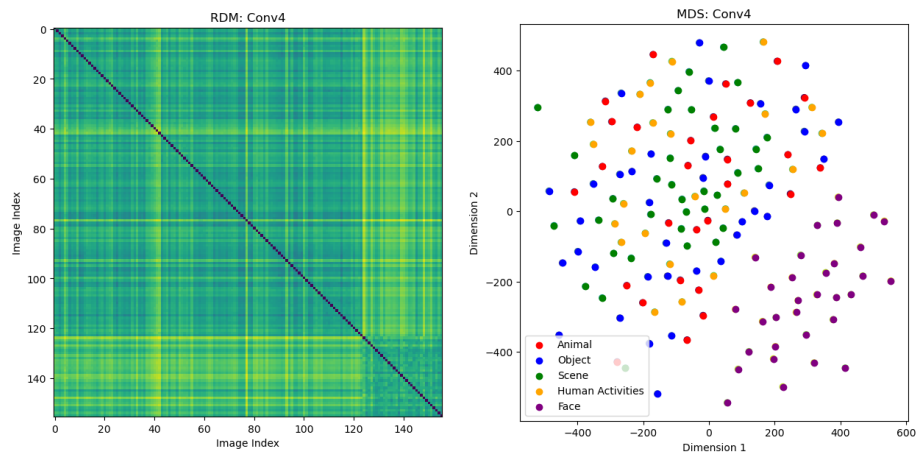


Figure 4: RDM and MDS for Conv 4 layer of the AlexNet model for the 156 images.

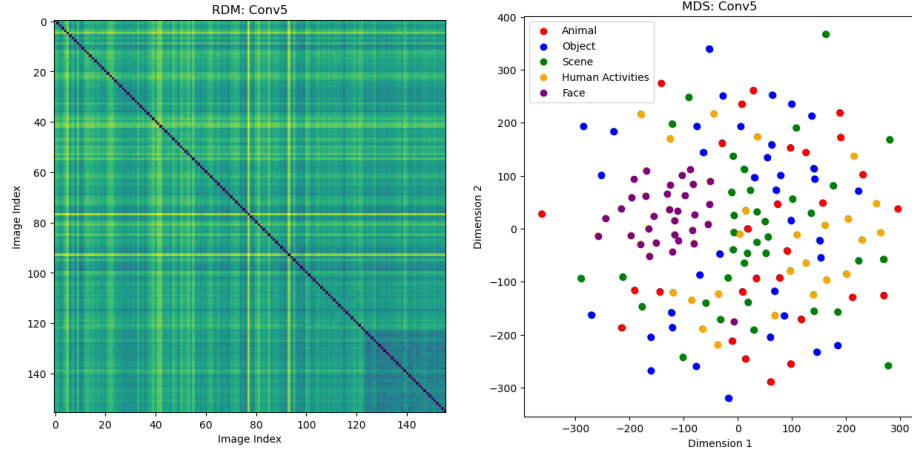


Figure 5: RDM and MDS for Conv 5 layer of the AlexNet model for the 156 images.

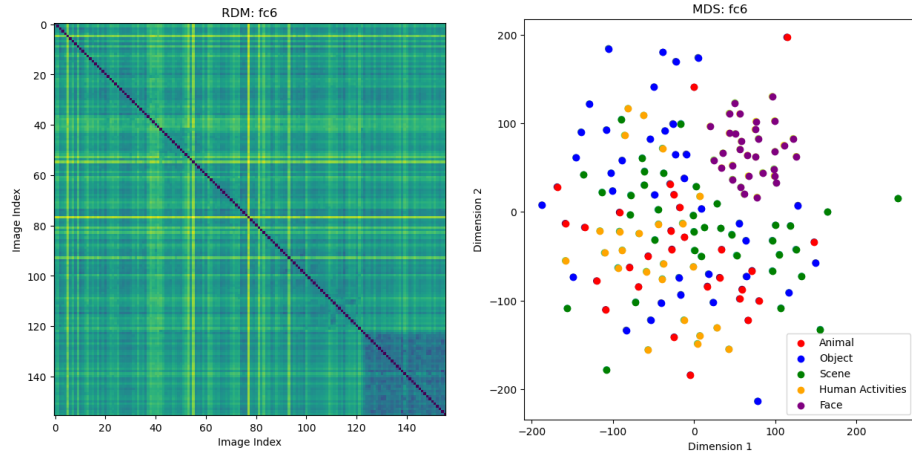


Figure 6: RDM and MDS for fc6 layer of the AlexNet model for the 156 images.

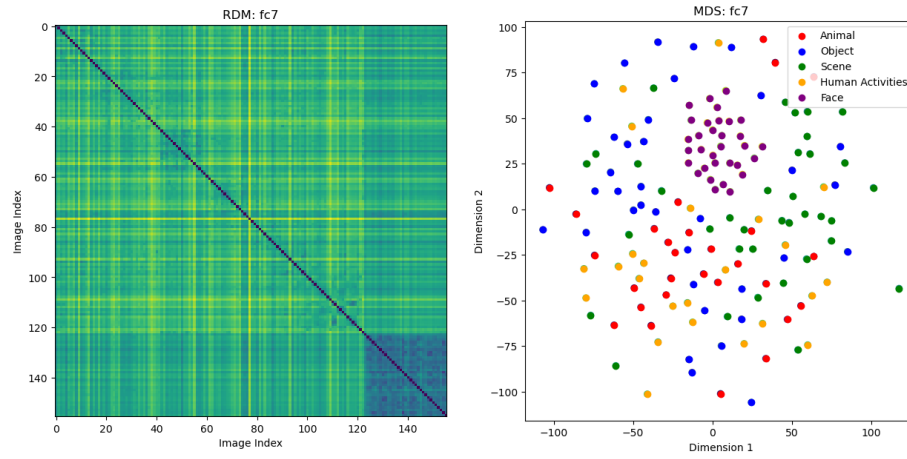


Figure 7: RDM and MDS for fc7 layer of the AlexNet model for the 156 images.